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| 10/549,753      | 09/21/2005  | Sumie Suda           | 278290US0XPCT       | 1304             |

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| EXAMINER |
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FOGARTY, CAITLIN ANNE

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| ART UNIT | PAPER NUMBER |
|----------|--------------|

1733

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12/10/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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|                              |                                      |                                    |  |
|------------------------------|--------------------------------------|------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/549,753 | <b>Applicant(s)</b><br>SUDA ET AL. |  |
|                              | <b>Examiner</b><br>CAITLIN FOGARTY   | <b>Art Unit</b><br>1733            |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/7/2010</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Status of Claims***

1. Claims 1 – 7 are pending where claim 1 has been amended.

### ***Status of Previous Rejections***

2. The 35 U.S.C. 103(a) rejection of claims 1 – 7 as being unpatentable over Hashimura et al. (US 6,338,763 B1) in view of "Fracture Toughness Properties-Effects of Microstructure and Heat Treatment" from the *Metals Handbook Desk Edition* has been maintained.

The nonstatutory obviousness-type double patenting rejection of claims 1 – 7 as being unpatentable over claims 1 – 14 of U.S. Patent No. 7,615,186 B2 in view of "Fracture Toughness Properties-Effects of Microstructure and Heat Treatment" from the *Metals Handbook Desk Edition* has been maintained.

### ***Claim Rejections - 35 USC § 103***

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 1 – 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimura et al. (US 6,338,763 B1) in view of "Fracture Toughness Properties-Effects of Microstructure and Heat Treatment" from the *Metals Handbook Desk Edition*.

Hashimura in view of the *Metals Handbook Desk Edition* is applied to claims 1 – 7 as set forth in the June 10, 2010 Office action. Claim 1 has been amended.

With respect to amended instant claim 1, the abstract, col. 2 line 13 – col. 4 line 14, and Table 4 Example 22 of Hashimura disclose a steel wire for high-strength

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springs having superior workability, the steel wire having tempered martensite, with a clearly overlapping composition as shown in the table below.

| <b>Element</b>          | <b>Claim 1<br/>(mass %)</b>   | <b>Hashimura et al.<br/>(mass %)</b>                             | <b>Overlapping Range<br/>(mass %)</b>                    |
|-------------------------|---|--|--|
| C                       | 0.53 – 0.68   | 0.4 – 0.7  | 0.53 – 0.68  |
| Si                      | 1.2 – 2.5   | 1.2 – 2.5  | 1.2 – 2.5  |
| Mn                      | 0.2 – 1.5   | 0.1 – 0.5  | 0.2 – 0.5  |
| Cr                      | 1.4 – 2.5   | 0.4 – 2.0  | 1.4 – 2.0  |
| Al                      | $0 < \text{Al} \leq 0.05$   | 0.0001 – 0.005   | 0.0001 – 0.005   |
| Ni, V, Mo, and/or<br>Nb | $0 < \text{Ni} \leq 0.4$<br>$0 < \text{V} \leq 0.4$<br>0.05 – 0.5 Mo<br>0.05 – 0.5 Nb | 0.1 – 2.0 Ni<br>0.050 – 0.4 V<br>0.1 – 2.0 Mo<br>0.005 – 0.05 Nb | 0.1 – 0.4 Ni<br>0.050 – 0.4 V<br>0.1 – 0.5 Mo<br>0.05 Nb |
| Fe + impurities         | Balance   | Balance  | Balance  |

Hashimura also discloses that the ratio ( $\sigma_{0.2}/\sigma_B$ ) of 0.2% proof stress ( $\sigma_{0.2}$ ) to tensile strength ( $\sigma_B$ ) is not less than 0.8 and not greater than 0.9. This overlaps with the ratio ( $\sigma_{0.2}/\sigma_B$ ) recited in claim 1 of from 0.67 to 0.85.

Hashimura differs from instant claim 1 because it does not specifically teach that the steel wire has a prior austenite grain size number of from 11.0 to 14.0. However, it would have been obvious to one of ordinary skill in the art to minimize the prior austenite grain size as much as possible as evidenced by p. 5 of “Fracture Toughness Properties-Effects of Microstructure and Heat Treatment” because an increased prior austenite grain size may have a detrimental effect on resistance to fatigue cracking of the steel wire for a high-strength spring.

Since the claimed compositional ranges for claims 1 – 7 either overlap or are within the ranges disclosed by Hashimura, a prima facie case of obviousness exists. See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art at the

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time the invention was made to select the claimed steel wire composition from the steel wire composition disclosed by Hashimura because Hashimura teaches the same utility (i.e. high-strength springs) in the whole disclosed range.

### ***Double Patenting***

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1 – 7 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 – 14 of U.S. Patent No. 7,615,186 B2 in view of “Fracture Toughness Properties-Effects of Microstructure and Heat Treatment” from the *Metals Handbook Desk Edition*.

Since the instant claimed compositional ranges either overlap or are within the ranges recited in U.S. Patent No. 7,615,186 B2, a prima facie case of obviousness exists. See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed steel composition from the steel composition recited in U.S. Patent No. 7,615,186 B2 because U.S. Patent No. 7,615,186 B2 teaches the same utility (i.e. a steel for a spring) in the whole disclosed range. U.S. Patent No. 7,615,186 B2 does not recite that the steel comprises tempered martensite, has a prior austenite grain size of from 11.0 to 14.0 and has a ratio ( $\sigma_{0.2}/\sigma_B$ ) of 0.2% proof stress ( $\sigma_{0.2}$ ) to tensile strength ( $\sigma_B$ ) in the steel wire of from 0.67 to 0.85. However, since the steel and high-strength spring of U.S. Patent No. 7,615,186 B2 have an overlapping composition with that of the instant claims and are made using a method similar to that of the instant claims, one of ordinary skill in the art would have expected the spring steel of U.S. Patent No. 7,615,186 B2 to have similar physical properties. Furthermore, it would have been obvious to one of ordinary skill in the art to minimize the prior austenite grain size as much as possible as evidenced by p. 5 of “Fracture

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Toughness Properties-Effects of Microstructure and Heat Treatment” because an increased prior austenite grain size may have a detrimental effect on resistance to fatigue cracking of the steel wire for a high-strength spring.

***Response to Arguments***

7. Applicant's arguments filed October 12, 2010 have been fully considered but they are not persuasive.

*Arguments are summarized as follows:*

a. Applicants have previously argued that the results in the present specification and the 132 Declaration submitted December 22, 2009 demonstrate the non-obviousness of the steel wire of claim 1. In response, the Office Action asserts that the experimental results that are of record in this application do not demonstrate non-obviousness over the entire scope of claim 1. While Applicants respectfully disagree, by this Amendment, claim 1 is amended to provide a range of prior austenite grain size numbers and a range of ratios ( $\sigma_{0.2}/\sigma_B$ ) of 0.2% proof stress ( $\sigma_{0.2}$ ) to tensile strength ( $\sigma_B$ ) that clearly corresponds in scope to the results shown in the present specification. As shown in Table 2 of the instant specification, Examples No. 1-5, 7-9, 11-13 and 20 have prior austenite grain size numbers and ratios ( $\sigma_{0.2}/\sigma_B$ ) of 0.2% proof stress ( $\sigma_{0.2}$ ) to tensile strength ( $\sigma_B$ ) within the scope within the ranges recited in claim 1. These examples are exemplary of the full scope of the ranges recited in claim 1. Examples 6, 10, and 14-19 have prior austenite grain size numbers and ratios ( $\sigma_{0.2}/\sigma_B$ ) of 0.2% proof stress ( $\sigma_{0.2}$ ) to tensile strength ( $\sigma_B$ ) that are outside the scope of claim 1. It is

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evident from the Examples described above that the values within the scope of claim 1 provide substantially superior performance in coiling and/or fatigue life in comparison to steel wires that differ with respect to one or more of the foregoing parameters. The Office Action has provided no basis for concluding that the results in Examples 1-5, 7-9, 11-13 and 20 are not commensurate in scope with the claims.

b. The experimental results in the Declaration were not submitted solely to demonstrate unexpected performance (although it is plain that the Examples in the present specification according to claim 1 exhibit far superior fatigue life in comparison to the comparative examples in the Declaration). The results were also provided to rebut an assertion in a previous Office Action that it would have been obvious to reduce the prior austenite grain size in the metals in Hashimura. The results in the Declaration demonstrate that one of ordinary skill in the art would not reasonably expect success upon modifying a steel wire to have a smaller prior austenite grain size. The results in the Declaration demonstrate that a steel composition according to Hashimura modified to have a prior austenite grain size as recited in claim 1 yields steel having far inferior fatigue life in comparison to steel composition as recited in claim 1. The Declaration indicates that the apparent disclosure in Metals Handbook that smaller prior austenite grain size is desirable would not alone have been sufficient to provide a skilled artisan with a reasonable expectation that merely modifying prior austenite grain size would result in quality steel wire.

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c. In regards to the double patenting rejection, claims 1-14 of US '186 do not recite or suggest the range of prior austenite grain size numbers or the range of ratios ( $\sigma_{0.2}/\sigma_B$ ) of 0.2% proof stress ( $\sigma_{0.2}$ ) to tensile strength ( $\sigma_B$ ) recited in claim 1. One of ordinary skill in the art would not have modified the steels of the claims of the US '186 patent as would be required to obtain steels satisfying the ranges of claim 1.

*Examiner's responses are as follows:*

a. The Examiner notes that the instant specification provides several examples in Table 2 of steels with a range of prior austenite grain size numbers and a range of ratios ( $\sigma_{0.2}/\sigma_B$ ) of 0.2% proof stress ( $\sigma_{0.2}$ ) to tensile strength ( $\sigma_B$ ) within the claimed ranges. However, the examples 6, 10, and 14-19 in Table 2 that provide examples outside of the claimed ranges do not demonstrate the criticality or unexpected results for either the prior austenite grain size numbers or the ratio ( $\sigma_{0.2}/\sigma_B$ ) as claimed in instant claim 1. In order to be commensurate in scope with claim 1, Applicant must demonstrate the criticality of both the minimum and maximum values of the claimed prior austenite grain size number range or the claimed ratio ( $\sigma_{0.2}/\sigma_B$ ) range. The examples 6, 10, and 14-19 only attempt to demonstrate the criticality of the upper limit of the claimed ratio ( $\sigma_{0.2}/\sigma_B$ ) range by citing an example with a ratio value of 0.89 which is above the claimed maximum and therefore the criticality data is not commensurate in scope with the instant claimed range. The comparative examples also only attempt to demonstrate the criticality of the lower limit of the claimed prior austenite grain

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size number range by citing an example with a grain size number of 10.5 which is below the claimed minimum and therefore the criticality data is not commensurate in scope with the instant claimed range. The examples 14-19 have steel compositions that are not within the instant claim 1 compositional ranges and therefore it is not clear whether the steel performance in coiling and/or fatigue life is related to the composition or the prior austenite grain size number and ratio ( $\sigma_{0.2}/\sigma_B$ ).

In order to demonstrate the criticality of the claimed prior austenite grain size number range, it is recommended that Applicant submit data in declaration form that demonstrates that a steel within the claim 1 compositional ranges with a ratio ( $\sigma_{0.2}/\sigma_B$ ) within the claimed ranges and a prior austenite grain size number of 10.9 and a steel within the claim 1 compositional ranges with a ratio ( $\sigma_{0.2}/\sigma_B$ ) within the claimed ranges and a prior austenite grain size number of 14.1 would have inferior properties when compared to a steel within the claim 1 compositional ranges with a prior austenite grain size number within the claimed range of 11.0 to 14.0. Alternatively, in order to demonstrate the criticality of the claimed ratio ( $\sigma_{0.2}/\sigma_B$ ), it is recommended that Applicant submit data in declaration form that demonstrates that a steel within the claim 1 compositional ranges with a ratio ( $\sigma_{0.2}/\sigma_B$ ) of 0.66 and a steel within the claim 1 compositional ranges with a ratio ( $\sigma_{0.2}/\sigma_B$ ) of 0.86 would have inferior properties when compared to a steel within the claim 1 compositional ranges with a ratio ( $\sigma_{0.2}/\sigma_B$ ) within the claimed range of 0.67 to 0.85.

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b. The Examiner maintains the position that a prima facie case of obviousness exists in regards to the claimed prior austenite grain size number range and the ratio ( $\sigma_{0.2}/\sigma_B$ ). The Declaration cites one example within the scope of Hashimura. However, the scope of Hashimura is not limited to the specific examples it teaches. See MPEP 2123. The Examiner relied on the broadest teaching of Hashimura in col. 2 line 13-col. 4 line 14 which teaches that the ratio ( $\sigma_{0.2}/\sigma_B$ ) is not less than 0.8 and not greater than 0.9 which overlaps with the claimed ratio ( $\sigma_{0.2}/\sigma_B$ ) range. As discussed above and in the previous Office Action, Hashimura does not specifically teach that the steel wire has a prior austenite grain size number of 11.0-14.0. However, it would have been obvious to one of ordinary skill in the art to minimize the prior austenite grain size as much as possible as evidenced by p. 5 of "Fracture Toughness Properties- Effects of Microstructure and Heat Treatment" because an increased prior austenite grain size may have a detrimental effect on resistance to fatigue cracking of the steel wire for a high-strength spring. Therefore, Applicant has not submitted evidence to overcome the prima facie case of obviousness. Rather, the data submitted by Applicant in the Declaration demonstrates the criticality of the maximum ratio ( $\sigma_{0.2}/\sigma_B$ ) value of 0.85 by demonstrating that a steel within the claimed compositional ranges with a prior austenite grain size number within the claimed range, but a ratio ( $\sigma_{0.2}/\sigma_B$ ) of 0.861, which is outside the claimed range, would have a significantly lower fatigue life. It is recommended that Applicant

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submit additional evidence to demonstrate the criticality of the minimum ratio value of 0.67 as discussed above in response a.

c. As discussed above, Applicant has not submitted factual evidence to overcome the prima facie case of obviousness in view of the claimed ratio ( $\sigma_{0.2}/\sigma_B$ ) and prior austenite grain size number and therefore the Examiner maintains the position as discussed above in regards to the double patenting rejection.

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAITLIN FOGARTY whose telephone number is

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(571)270-3589. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Roy King/  
Supervisory Patent Examiner, Art  
Unit 1733

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